



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/568,985

02/21/2006

Yukihiro Morita

504780100

3592

52044

7590

01/08/2008

SNELL & WILMER L.L.P. (Matsushita)

600 ANTON BOULEVARD

SUITE 1400

COSTA MESA, CA 92626

EXAMINER

VAZQUEZ, ARLEEN M

ART UNIT

PAPER NUMBER

2829

MAIL DATE

DELIVERY MODE

01/08/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,985	MORITA ET AL.	
	Examiner	Art Unit	
	Arleen M. Vazquez	2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10,13,14 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,13,14 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Species of claims 1-10 and 13-14 in the reply filed on 10/23/2007 is acknowledged.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "spectrum measurement unit", "a variation detection unit", "intensity detection unit" and "a determining unit" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 6 and 8 are objected to because of the following informalities:

In claim 6 the limitation of "the spectrum measuring device" has no antecedent basis. It should be changed to "the spectrum measuring unit".

Claim 8 shares same informalities as claim 6.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by ***Larson et al. (US 5,315,113)***.

Regarding claims 1,3-5 and 7-10 the recitations of "operable to measure", "operable to detect", "operable to irradiate" and "operable to determine", pertains to the manner on which the claimed apparatus is intended to be employed. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham, 2 USPQ F.2d 1647 (1987)*.

As to claims 1,2,5,6,9 and 13, **Larson et al.** discloses in Figure 1 an insulating film measuring device (10) for evaluating properties of an insulating film (12, see abstract), the insulating film measuring device comprising an ion irradiating unit (98) operable to irradiate the insulating film (12) with ions (100); and a spectrum measurement unit (88) operable to measure a spectrum of secondary electrons (emitted from the insulating film (12) during ion irradiation and/or ion irradiation has stopped (ion gun 98 can be operated by pause and pulses or continuously, Col. 9 Ins 7-12), wherein the spectrum measurement unit (88) measures, over time, the spectrum of secondary electrons (SED) emitted from the insulating film (12).

Regarding claims 3,4,7,8 and 10 it appears the insulating measuring device performs a series of detections such as to detect an amount of variation in a peak, to detect intensity of a peak, to determine energy difference, using the same unit which is disclosed as "analyzing device 200" which can be interpreted as being a computer (data processor) in communication with insulating film. **Larson et al.** comprises a processor 76 which can be, as mentioned above, operable to perform this types of detections and measures.

As to claims 3,4,7 and 8, **Larson et al.** discloses in Figure 1 a processor 76 including analyzing portion 74 which include a variation detection unit and an intensity detection unit operable to detect, based on a secondary electron measurement result (SED) measured over time by the spectrum measurement unit (88), an intensity and a variation in a peak appearing at a lower energy level than the peak due to kinetic emission of secondary electrons (secondary electrons emitted by insulating film have a

lower energy level due to their kinetic energy because the electrons loose energy levels when they are reflected from the insulating film to the spectrum measurement unit, therefore is possible for the variation detection unit to detect a variation based on the energy level and the kinetic emission and for the intensity detection unit to detect the intensity based in the energy). As mentioned above, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham, 2 USPQ F.2d 1647 (1987).*

As to claim 10, **Larson et al.** discloses in Figure 1 a processor 76 including analyzing portion 74 which include a determining unit operable to determine, after ion irradiation has stopped (by unit 102), based on the spectrum measured (SED) by the spectrum measurement unit (88), an energy difference between a first peak due to kinetic emission of secondary electrons measured during ion irradiation and a second peak appearing at a lower energy level than the first peak (With each irradiation of ions to the insulating film, the thickness of the film varies, therefore each irradiation of electrons will have and amount of energy different from the other, and this will be represented by a graph in the monitor 78 showing a difference between secondary electrons based on time and kinetic energy allowing to determine a change in energy by comparing their peaks). As mentioned above, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham, 2 USPQ F.2d 1647 (1987).*

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over ***Larson et al. (US 5,315,113)*** in view of ***Nakanishi et al. (US 5,834,791)***.

As to claim 14, ***Larson et al.*** discloses everything above but fails to teach the electron density of states is measure in valence bands of the insulating film. However, ***Nakanishi et al.*** in Figure 3 the electron density of states is measure in valence bands (Graph of Figure 3 shows how the energy of the electrons are represented by valence bands, Col. 9 ln 64- Col. 10 ln 8) of the insulating film (16).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of ***Larson et al.*** by having the density of the electrons measure in valence bands as taught as ***Nakanishi et al.*** to allow graphic representation of the electrons.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over ***Larson et al. (US 5,315,113)*** in view of ***Wada et al. (US 5,723,367)***.

As to claim 26, ***Larson et al.*** discloses everything above but fails to teach wherein the insulating film is mounted on a conductive substrate and further includes means for applying a negative voltage to the conductive substrate during the measurement of the spectrum of secondary electrons. However, ***Wada et al.*** discloses

in Figure 1E and 2 the insulating film (12) is mounted on a conductive substrate (11) and further includes means (7 and 3) for applying a negative voltage to the conductive substrate (11).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of **Larson et al.** by having the insulating film disposed in a substrate and a negative voltage applied to it as taught as **Wada et al.** to avoid electrical interference between the other elements of the measuring device.

Claims 27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Larson et al. (US 5,315,113)** in view of **Hamamura et al. (US 6,303,932)**.

As to claims 27 and 30, **Larson et al.** discloses everything above but fails to teach means for applying a vacuum to the insulating film during the measurement of the spectrum of secondary electrons and wherein the ion irradiating unit irradiates argon ions. However, **Hamamura et al.** discloses in Figure 1 means (5) for applying a vacuum to the insulating film (7) during the measurement of the spectrum of secondary electrons (8) and wherein the ion irradiating unit (2) irradiates argon ions (Col. 14 Ins 18-22).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of **Larson et al.** by having a vacuum applied to the insulating film as taught as **Hamamura et al.** to avoid damage to the film and at the same time to secure the film to be tested.

As to claims 29 and 31, **Larson et al.** discloses in Figure 1 a processor 76 including analyzing portion 74 which include a variation detection unit connected to the spectrum measurement unit (88) to measure a conveyance time, T1 and a shift amount

change in E, wherein conveyance time, T1, is a time period from starting an irradiation measurement (SED) to convergence of a rise position of a subsequent measurement and change in E is the amount of energy, eV, during T1 (based on the irradiation of the electrons flowing with respect to time and with different energy levels is possible to determine the changed in energy based on time) and means (analyzing portion 74 or processor 76) for measuring a shape of low energy level secondary electron (SED) peaks in one of during ion irradiation and after ion irradiation wherein intensity, position and shape of the low energy level secondary electron peaks correlated with a capability of the insulating film to emit secondary electrons (With each irradiation of ions to the insulating film, the thickness of the film varies, therefore each irradiation of electrons will have and amount of energy different from the other, and this will be represented by a graph in the monitor 78 showing a difference between secondary electrons based on time and kinetic energy allowing to determine a change in energy by comparing their peaks).

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Larson et al. (US 5,315,113)** in view of **Hamamura et al. (US 6,303,932)** further in view of **Fries (US 6,764,796)**.

As to claim 28, the combination of **Larson et al.** and **Hamamura et al.** discloses everything above but fails to teach wherein the insulating film is MgO. However, **Fries** discloses in Figure 2 wherein the insulating film (35) is MgO.

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the combined teachings of **Larson et al.** and **Hamamura et al.** by

having an insulating film of MgO as taught as *Hamamura et al.* to prevent damage to the substrate from ions and to allow the device to operate at lower voltages.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Klyachko et al. (US 6,635,869) discloses a "Step function determination of auger peak intensity".

Sugiyama (US 6,177,670) discloses a "Method of observing secondary ion image by focused ion beam".

Gerlach et al. (US 6,949,756) discloses a "Shaped and low density focused ion beams".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arleen M. Vazquez whose telephone number is 571-272-2619. The examiner can normally be reached on Monday to Friday, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on 571-272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/568,985
Art Unit: 2829

Page 10

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMV



HA TRAN NGUYEN
SUPERVISORY PATENT EXAMINER

1/4/8